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# ANNUAL REPORT

## 1962

## TOWN OF POINT EDWARD

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Point Edward : sewage
treatment plant.

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# POINT EDWARD SEWAGE TREATMENT PLANT

PROJECT NO. 59-S-36

OPERATED FOR

THE TOWN OF POINT EDWARD

BY

THE ONTARIO WATER RESOURCES COMMISSION

| | | |
|---|---|---|
| Mr. A. M. Snider | - | Chairman |
| Dr. A. E. Berry | - | General Manager |
| Mr. D. S. Caverly | - | Assistant General Manager, and Director of Plant Operations |
| Mr. B. C. Palmer | - | Assistant Director, Division of Plant Operations. |
| Mr. A. C. Beattie | - | Project Engineer, Division of Plant Operations |

Prepared by the
Division of Plant Operations.

# POINT EDWARD - ANNUAL REPORT

## GENERAL

The Point Edward Sewage Treatment Plant was completed and put into operation in June of 1961. Treatment consists of screening, grit removal, sedimentation, digestion and chlorination. The plant was designed for a population of 5700 persons at a per capita flow of 100 gallons per day or 570,000 gallons per day.

## DESCRIPTION OF SYSTEM

### Pumping Stations

There are two Smith & Loveless package lift stations pumping sewage to the treatment plant. Each is equipped with two 500 GPM at 20 foot head pumps.

A 16-inch diameter inlet sewer conveys the sewage to the inlet wet well at the plant where two raw sewage pumps lift it through the treatment works.

Each of the raw sewage pumps is a Fairbanks-Morse vertical centrifugal pump with 1300 US GPM capacity at 35 foot head, driven by a 15 HP Tamper electric motor.

There is a 10-inch bypass on the discharge side of the raw sewage pumps.

### Bar Screens

Coarse material is removed from the incoming sewage by manually cleaned bar screens located in the influent end of the grit chambers. The $\frac{1}{4}$" x 1" bars have $1\frac{1}{2}$" centres.

Grit Chambers

The two grit chambers in parallel, each 16' x 1.75' x 2' deep are equipped with proportional weirs to maintain the flow velocity at 1 foot per second. One grit chamber is used at a time.

Primary Clarifier

Following grit removal the sewage enters the primary clarifier. The Dorr-Oliver-Long clarifier is 30 feet in diameter with 10 ft. S.W.D. complete with skimmer. The retention period at the design flow is 1.85 hours. The surface settling rate is 808 gallons per square foot of tank per day. The overflow rate is 6050 gallons per lineal foot of weir per day.

The tanks are mechanically cleaned by scrapers which continually collect the sludge to a hopper where it is withdrawn and pumped periodically to the digester by a Carter piston raw sludge pump having a rated capacity of 100 GPM at a 20 foot head driven by a 2 HP electric motor.

Scum is collected in the scum hopper where it is pumped by the raw sludge pump to the digester.

Chlorination

A 20' x 10' x 8.5' baffled chlorine contact chamber provides a 27 minute retention period at design flow.

Chlorination is provided by a Builders - Providence Chlorinizer equipped with a 200 pound orifice and weigh scales.

The plant effluent is discharged to the St. Clair River approximately 1200 feet downstream from the Sarnia water intake.

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Flow

The effluent flow leaving the chlorine contact chamber is measured by a Bristol totalizer and recording meter.

Digester

Primary sludge is pumped from the clarifier to the fixed roof type heated digester which is 30 feet in diameter by 20 feet wide. The 15,140 cu.ft. digester volume provides a digester capacity of 2.66 cu.ft. per capita. The digesting sludge is recirculated through the heat exchanger by a Fairbanks-Morse centrifugal pump with a 75 GPM capacity at a 21 foot head. Supernatant which can be selected by a swing type supernatant selector is returned to the raw sewage wet well of the pumping station.

The Dorr-Oliver-Long spiral hot water heat exchanger is heated by a natural gas furnace. There is no provision for utilizing digester gas as fuel. The digester gas is burned as waste.

The digested sludge is trucked away for disposal on land.

A Fairbanks-Morse centrifugal pump with 280 GPM capacity at 12 ft. head is used for pumping the digester sludge to the truck.

TABLE I

FLOW RECORDS (M.G.D.)

| MONTH | MAXIMUM | MINIMUM | AVERAGE DAILY FLOW | TOTAL MONTHLY FLOW |
|---|---|---|---|---|
| Jan. | ----- | ----- | 0.138 | 4.285 |
| Feb. | 0.288 | 0.112 | 0.152 | 4.251 |
| Mar. | 0.367 | 0.124 | 0.152 | 4.710 |
| Apr. | 0.145 | 0.116 | 0.131 | 3.936 |
| May | 0.156 | 0.121 | 0.137 | 4.244 |
| June | 0.263 | 0.101 | 0.159 | 4.783 |
| July | 0.152 | 0.126 | 0.141 | 4.376 |
| Aug. | 0.165 | 0.130 | 0.152 | 4.727 |
| Sept. | 0.182 | 0.156 | 0.167 | 5.031 |
| Oct. | 0.367 | 0.110 | 0.232 | 7.212 |
| Nov. | 0.169 | 0.087 | 0.140 | 4.194 |
| Dec. | 0.172 | 0.141 | 0.153 | 4.748 |
| AVERAGE: | 0.221 | 0.120 | 0.155 | 4.710 |

TOTAL YEARLY FLOW ---------- 56.5 Million Gallons

OPERATING COST PER MILLION GALLONS = $\frac{9670.86}{56.5}$ = $ 171.20

TABLE II

GRIT REMOVAL

| MONTH | CUBIC FEET GRIT | CUBIC FEET GRIT/MG SEWAGE |
|---|---|---|
| Jan. | 34.5 | 8.1 |
| Feb. | 20.75 | 4.9 |
| Mar. | 16.0 | 3.4 |
| Apr. | 17.0 | 4.3 |
| May | 25.75 | 6.1 |
| June | 18.75 | 3.9 |
| July | 24.5 | 5.6 |
| Aug. | 27.5 | 5.8 |
| Sept. | 18.75 | 3.7 |
| Oct. | 29.8 | 4.1 |
| Nov. | 27.8 | 6.6 |
| Dec. | 10.1 | 2.1 |
| AVERAGE: | 22.6 | 4.9 |

The quantity of grit removed at the plant is above average but is not considered excessive.

## OPERATING RESULTS

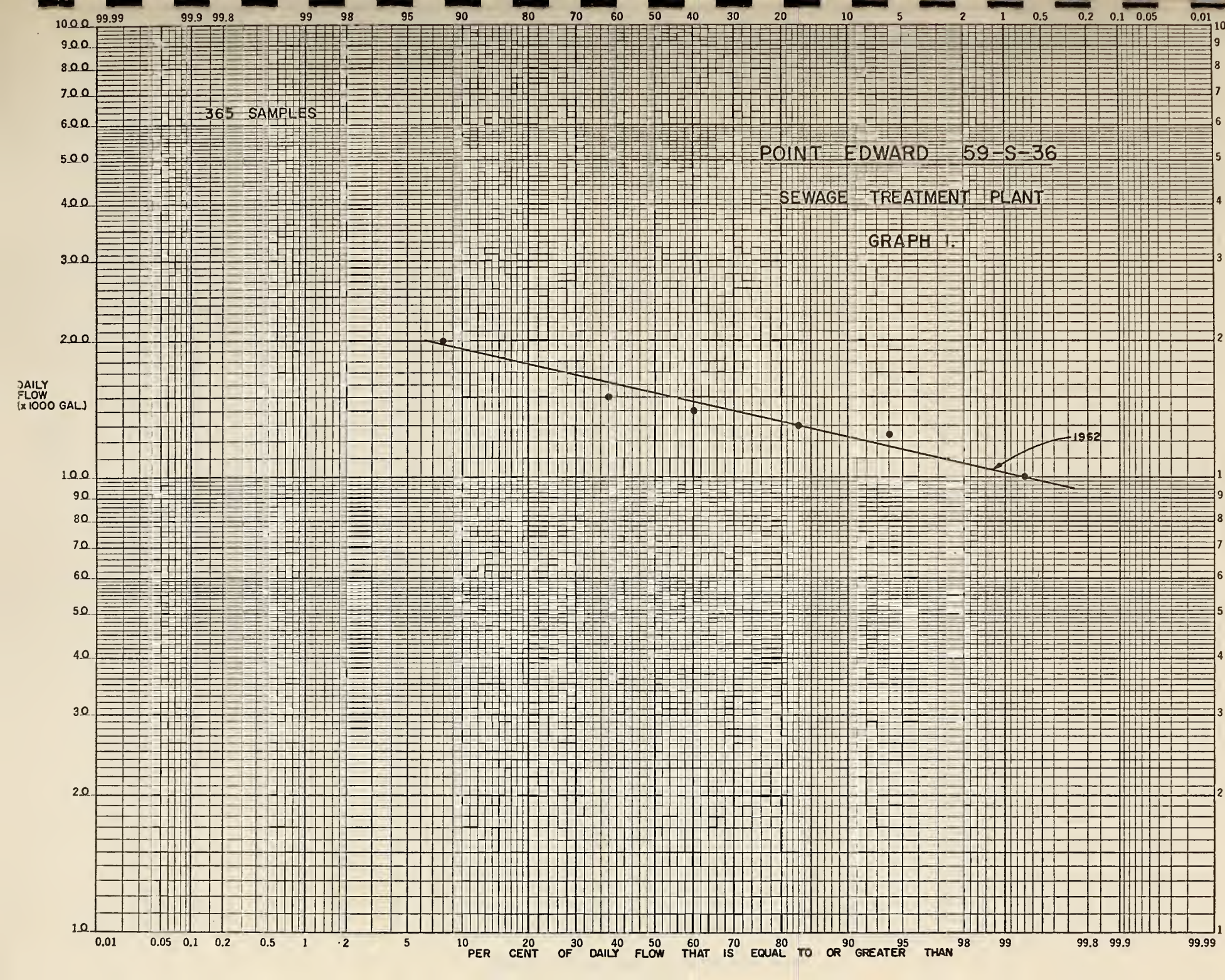
### Plant Loadings and Removal

TABLE I indicates that the average daily flow for 1962 was 0.155 MGD while the average monthly flow was 4.710 million gallons. The average daily flow per month reached a maximum of 0.367 million gallons per day in both March and October and a minimum of 0.145 million gallons per day during April. The total flow through the plant for 1962 was 56.5 million gallons.

GRAPH # 1 shows that in 1962 the daily flow for the Point Edward Plant was below 100,000 gallons only 1% of the time and below 200,000 gallons 92% of the time and 50% of the daily flows were about 150,000 gallons.

TABLE III is a list of the sample results for 1962 obtained by sending samples to the OWRC laboratory every second week. The average BOD was 258 ppm in the raw sewage, reduced to 144 ppm for a monthly reduction of about 2.7 tons BOD. The suspended solids in the raw sewage averaged 274 ppm while the treated sewage averaged only 74 ppm for a reduction of about 4.7 tons per month. The plant performed a 44% reduction of BOD and a 73% reduction of suspended solids.

GRAPH # 2 indicates the concentration of BOD and SS in the raw sewage and final effluent.


365 SAMPLES
POINT EDWARD 59-S-36
SEWAGE TREATMENT PLANT
GRAPH I.
1962
DAILY FLOW (x 1000 GAL.)
PER CENT OF DAILY FLOW THAT IS EQUAL TO OR GREATER THAN
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99
1000 900 800 700 600 500 400 300 200 100 90 80 70 60 50 40 30 20 10

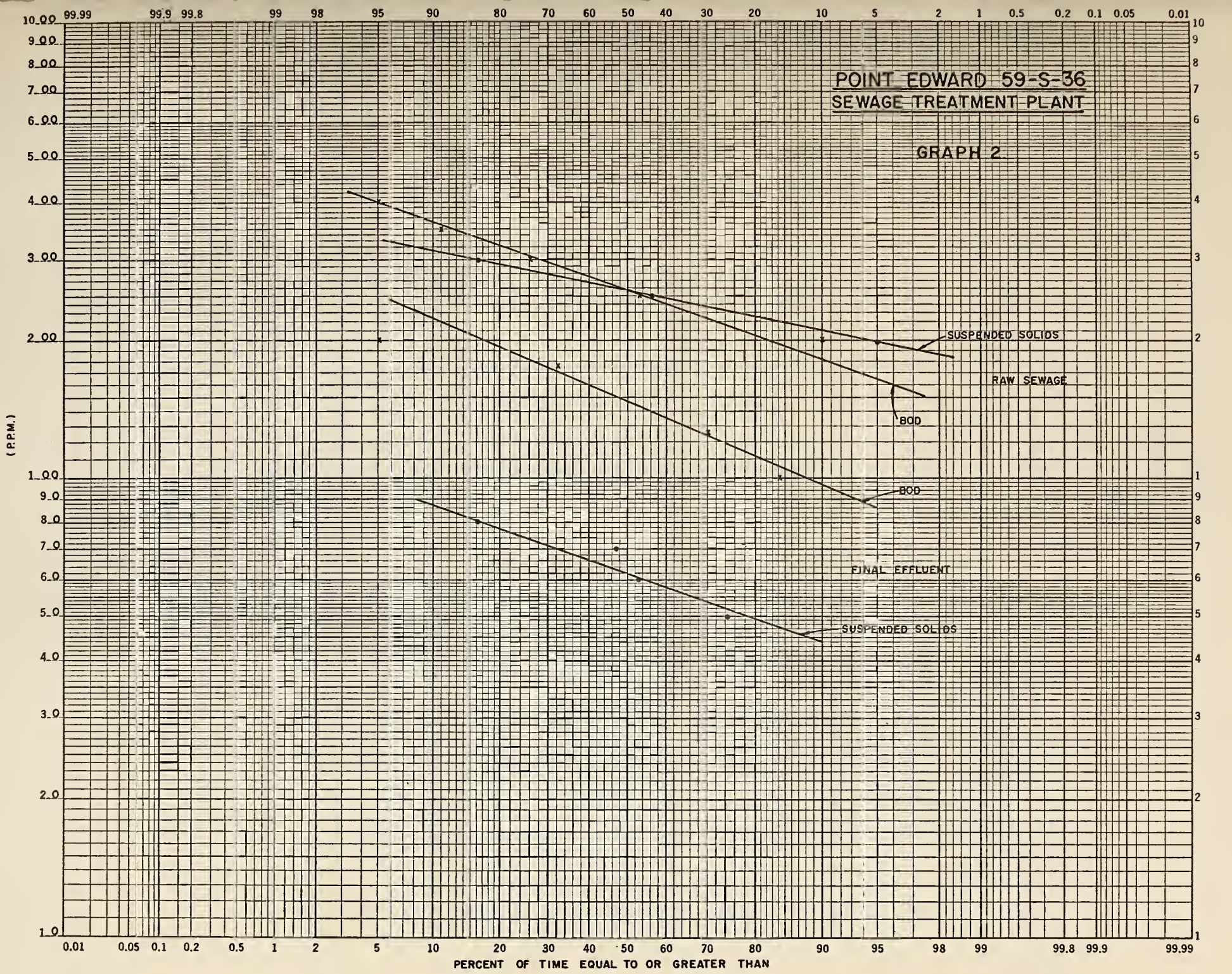

POINT EDWARD 59-S-36
SEWAGE TREATMENT PLANT
GRAPH 2
SUSPENDED SOLIDS
RAW SEWAGE
BOD
BOD
FINAL EFFLUENT
SUSPENDED SOLIDS
(P.P.M.)
PERCENT OF TIME EQUAL TO OR GREATER THAN
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99
10.00 9.00 8.00 7.00 6.00 5.00 4.00 3.00 2.00 1.00 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0

TABLE III

SAMPLE RESULTS

1962

| MONTH | AVERAGE BOD | | % REDUCTION | AVERAGE S.S. | | % REDUCTION |
|---|---|---|---|---|---|---|
| | Infl. | Effl. | | Infl. | Effl. | |
| March | 80 | 62 | 23 | 246 | 154 | 37 |
| | 235 | 170 | 28 | 256 | 44 | 83 |
| April | 230 | 190 | 17 | 224 | 72 | 68 |
| | 400 | 180 | 55 | 570 | 74 | 87 |
| May | 390 | 124 | 68 | 294 | 60 | 80 |
| | 205 | 165 | 20 | 222 | 56 | 75 |
| June | 195 | 106 | 46 | 204 | 44 | 79 |
| | 300 | 134 | 55 | 310 | 55 | 82 |
| July | 230 | 92 | 60 | 268 | 47 | 83 |
| | 255 | 118 | 54 | 261 | 41 | 84 |
| August | 205 | 144 | 30 | 222 | 48 | 78 |
| | 325 | 138 | 58 | 424 | 52 | 88 |
| September | 215 | 128 | 40 | 174 | 54 | 69 |
| | 260 | 160 | 39 | 252 | 72 | 72 |
| October | 315 | 75 | 76 | 276 | 74 | 73 |
| | 275 | 72 | 74 | 293 | 77 | 74 |
| | 285 | 230 | 19 | 229 | 83 | 64 |
| November | 240 | 180 | 25 | 252 | 187 | 26 |
| | 250 | 195 | 22 | 243 | 78 | 68 |
| December | 275 | 205 | 26 | 245 | 112 | 54 |
| AVERAGE: | 258 | 144 | 44 | 274 | 74 | 73 |

BIOCHEMICAL OXYGEN DEMAND

It is seen that 90 percent of the time the BOD of the raw sewage exceeds 180 ppm and 10 percent of the time it exceeds 360 ppm.

It is also seen that 90 percent of the BOD of the final effluent exceeds 96 ppm and 10 percent of the time it exceeds 220 ppm.

SUSPENDED SOLIDS

It is seen that 90 percent of the time the SS of the raw sewage exceeds 210 ppm and 10 percent of the time it exceeds 310 ppm.

It is also seen that 90 percent of the SS of the final effluent exceeds 44 ppm and 10 percent of the time it exceeds 84 ppm.

GENERAL DISCUSSION

1962 was the first full year of operation and the plant operated without any difficulty. The sewage treatment plant and pumping stations are operated by Mr. Gordon Barwise. The plumbing inspector for the town also uses the office at the plant. He periodically assists Mr. Barwise in the operation of the plant and acts as a substitute operator when the regular operator is on vacation or absent from the plant for a period of time.

The plant is supervised approximately 8 hours per day from Monday to Friday and is checked over on Saturdays and Sundays. Power failures and high sewage levels in the wet well at the plant are telemetered to the operator's house.

A garage was constructed on the plant site during 1962 and was finished in May. In addition the driveway into the plant and the sludge loading area was paved.

## SLUDGE HAULAGE

Tenders for the removal of liquid digested sludge were opened on May 2, 1962. Robertson's Septic Tank Service of Sarnia were the only bidders at a price of $ 1.20 per cubic yard. Sludge is hauled away in a 1500 gallon tank truck every Monday and Thursday. Beginning in late October 1962 sludge was hauled away from the digester. During November and December approximately 80 cubic yards of sludge were removed. It is expected that sludge will be hauled all through 1963 at this rate.

## SEWERS AND PUMPING STATIONS

During the summer some of the paint on the interior of the pumping stations proved faulty. The stations were repainted by the manufacturer in June and are now satisfactory.

Mr. Barwise started his annual sewer inspection in the spring of 1962. In general, very little sedimentation was found except in areas of very low flow and these have been flushed clean when required. The inspection program will continue in 1963.

## INSPECTIONS

In 1962, the water pollution control plant at Point Edward was visited for the purpose of inspection on 7 occasions by project engineers from the Division of Plant Operations of the OWRC. In addition, the Electronics Section made three trouble calls and the Maintenance Section made their annual inspection visit to check thoroughly every piece of equipment in the plant.

TABLE VI

1962 OPERATING EXPENSES

| MONTH | EXPEND. | PAYROLL | CASUAL PAYROLL | FUEL | POWER | CHEM. | GEN.SUPP. | EQUIP. | REPAIR & MAIN. | SUNDRY | WATER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 548.07 | 342.22 | | 182.39 | | | | 9.24 | | 14.22 | |
| Feb. | 872.61 | 342.22 | | 158.73 | 63.31 | 106.22 | 176.26 | | | 25.87 | |
| Mar. | 714.95 | 338.46 | | 137.26 | 136.32 | | 81.49 | | | 21.42 | |
| Apr. | 842.55 | 338.46 | | 131.85 | | 281.22 | 64.42 | | | 26.60 | |
| May | 373.30 | 338.46 | | | 78.95 | (350.00) | 121.02 | 139.00 | | 45.87 | |
| June | 1,135.70 | 338.46 | | 213.71 | 66.96 | 281.22 | 98.62 | 51.65 | | 85.08 | |
| July | 456.49 | 338.46 | | 89.99 | 68.24 | (68.78) | 10.36 | | | 18.22 | |
| Aug. | 622.07 | 507.69 | | | 74.19 | | 16.32 | | | 23.87 | |
| Sept. | 994.79 | 338.46 | | 139.20 | 138.52 | 281.22 | 52.01 | | | 45.38 | |
| Oct. | 507.56 | 338.46 | | 76.10 | 71.11 | | 7.67 | | | 14.22 | |
| Nov. | 1,222.71 | 338.46 | | 99.54 | 70.66 | 562.44 | 93.24 | | | 58.37 | |
| Dec. | 1,380.06 | 507.69 | | 133.65 | 69.35 | 281.22 | 14.91 | | | 177.14 | 196.1 |
| TOTAL: | 9,670.86 | 4,407.50 | | 1,362.42 | 837.61 * | 1,374.76 | 736.32 | 199.89 | | 556.26 | 196.1 |

* - The power bills cover the period of December 1961 to November 1962 inclusive.

POWER CONSUMPTION

SEWAGE TREATMENT PLANT

| MONTH | TOTAL CONSUMPTION K.W.H. | 1st. Rate | 2nd. Rate | 3rd. Rate | SERVICE CHARGE | TOTAL BILL | |
|---|---|---|---|---|---|---|---|
| | | | | | | Gross | Net |
| Jan. | 4,000 | 1,275 | 1,275 | 1,450 | 12.75 | 44.31 | 39.88 |
| Feb. | 3,750 | 1,750 | 1,750 | 250 | 17.50 | 55.08 | 49.57 |
| Mar. | 4,150 | 2,000 | 2,000 | 150 | 20.00 | 62.50 | 56.25 |
| Apr. | 4,150 | 1,500 | 1,500 | 1,150 | 15.00 | 50.30 | 45.27 |
| May | 3,850 | 1,500 | 1,500 | 850 | 15.00 | 49.31 | 44.38 |
| June | 4,400 | 1,500 | 1,500 | 1,400 | 15.00 | 51.12 | 46.01 |
| July | 3,750 | 1,500 | 1,500 | 750 | 15.00 | 48.98 | 44.08 |
| Aug. | 3,800 | 1,500 | 1,500 | 800 | 15.00 | 49.14 | 44.23 |
| Sept. | 4,200 | 1,500 | 1,500 | 1,200 | 15.00 | 50.46 | 45.41 |
| Oct. | 4,200 | 1,500 | 1,500 | 1,200 | 15.00 | 50.46 | 45.41 |
| Nov. | 4,200 | 1,500 | 1,500 | 1,200 | 15.00 | 50.46 | 45.41 |
| Dec. | 4,800 | 1,500 | 1,500 | 1,800 | 15.00 | 52.44 | 47.20 |
| TOTAL: | 49,250 | | | | 185.25 | 614.56 | 553.10 |

POWER CONSUMPTION

HELENA ST. PUMPING STATION

| MONTH | TOTAL CONSUMPTION K.W.H. | 1st Rate | 2nd Rate | 3rd. Rate | SERVICE CHARGE | TOTAL BILL | |
|---|---|---|---|---|---|---|---|
| | | | | | | Gross | Net |
| Jan. | 260 | 260 | ---- | ---- | 12.90 | 17.06 | 15.35 |
| Feb. | 220 | 220 | ---- | ---- | 16.80 | 20.32 | 18.29 |
| Mar. | 280 | 280 | ---- | ---- | 12.60 | 17.08 | 15.37 |
| Apr. | 260 | 260 | ---- | ---- | 12.60 | 16.76 | 15.08 |
| May | 380 | 380 | ---- | ---- | 12.60 | 18.68 | 16.81 |
| June | 500 | 500 | ---- | ---- | 12.60 | 20.60 | 18.54 |
| July | 460 | 460 | ---- | ---- | 12.60 | 19.96 | 17.96 |
| Aug. | 500 | 500 | ---- | ---- | 12.60 | 20.60 | 18.54 |
| Sept. | 520 | 520 | ---- | ---- | 12.60 | 20.92 | 18.83 |
| Oct. | 480 | 480 | ---- | ---- | 12.60 | 20.28 | 18.25 |
| Nov. | 440 | 440 | ---- | ---- | 12.60 | 19.64 | 17.68 |
| Dec. | 480 | 480 | ---- | ---- | 13.00 | 20.68 | 18.61 |
| TOTAL: | 4,780 | | | | $156.10 | 232.58 | 209.31 |

# POWER CONSUMPTION

## MICHIGAN AVENUE PUMPING STATION

| MONTH | TOTAL CONSUMPTION | 1st Rate | 2nd Rate | 3rd Rate | SERVICE CHARGE | TOTAL BILL | |
|---|---|---|---|---|---|---|---|
| | | | | | | Gross | Net |
| Jan. | 140 | 140 | ---- | ---- | 4.95 | 7.19 | 6.47 |
| Feb. | 160 | 160 | ---- | ---- | 4.95 | 7.51 | 6.76 |
| Mar. | 200 | 200 | ---- | ---- | 4.95 | 8.15 | 7.33 |
| Apr. | 150 | 150 | ---- | ---- | 4.95 | 7.35 | 6.61 |
| May | 180 | 180 | ---- | ---- | 4.95 | 7.83 | 7.05 |
| June | 360 | 360 | ---- | ---- | 4.95 | 10.71 | 9.64 |
| July | 310 | 310 | ---- | ---- | 2.80 | 7.76 | 6.98 |
| Aug. | 320 | 280 | 40 | ---- | 2.80 | 7.48 | 6.73 |
| Sept. | 350 | 280 | 70 | ---- | 2.80 | 7.63 | 6.87 |
| Oct. | 380 | 280 | 100 | ---- | 2.80 | 7.78 | 7.00 |
| Nov. | 260 | 260 | ---- | ---- | 2.80 | 6.96 | 6.26 |
| Dec. | 260 | 260 | ---- | ---- | 3.00 | 7.16 | 6.44 |
| TOTAL: | 3,070 | | | | 46.70 | 93.51 | 84.14 |

HEATING COSTS

SEWAGE TREATMENT PLANT

| MONTH | $Ft.^3$ Used x 100 | Cost | Heating Cost / 1000 Gal. |
|---|---|---|---|
| Jan. | 1629 | 159.40 | 3.7 ¢ |
| Feb. | 1622 | 158.73 | 3.7 |
| Mar. | 1396 | 137.26 | 2.9 |
| Apr. | 1339 | 131.85 | 3.3 |
| May | 1113 | 110.37 | 2.6 |
| June | 843 | 84.18 | 1.7 |
| July | 758 | 75.80 | 1.7 |
| Aug. | 649 | 65.07 | 1.3 |
| Sept. | 741 | 74.13 | 1.4 |
| Oct. | 761 | 76.10 | 1.1 |
| Nov. | 999 | 99.54 | 2.3 |
| Dec. | 1358 | 133.65 | 2.8 |
| | | 1,306.08 | |

Heating Cost per 1000 gal. of sewage $= \frac{1306.08}{56500} = 2.3$ ¢

Power cost per 1000 gal. of sewage $= \frac{837.61}{56500} = 1.4$ ¢